

Validation and Data Set Intercomparison Service

The Validation and Data Set Intercomparison service provides a confidence interval for the average difference between two quantities. The average difference of measurement 1 relative to measurement 2, $B(X_1, X_2)$, is estimated by the difference between the means of X_1 and X_2 :

$$\hat{B}(X_1, X_2) = (\bar{X}_1 - \bar{X}_2).$$

A 95% confidence interval for $B(X_1, X_2)$ is,

$$\left[\hat{B}(X_1, X_2) - t_{.025, f} S, \hat{B}(X_1, X_2) + t_{.025, f} S \right], \quad (1)$$

where $t_{.025, f}$ is the t -value associated with a right-tail probability of .025 for the t distribution with f degrees of freedom, and S is the standard deviation of $\hat{B}(X_1, X_2)$. The standard deviation of $\hat{B}(X_1, X_2)$ is

$$S = \sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}},$$

where S_1^2 is the variance of the values of measurement 1, S_2^2 is the variance of the values of measurement 2, n_1 is the number of values of measurement 1, and n_2 is the number of values of measurement 2. The degrees of freedom, f is,

$$f = \frac{(S_1^2/n_1 + S_2^2/n_2)^2}{(S_1^2/n_1)^2/(n_1 - 1) + (S_2^2/n_2)^2/(n_2 - 1)}.$$

The Validation and Data Set Intercomparison service returns the confidence interval shown in (??).